

NOTES ON THE GENUS *ZAGRAMMOSOMA*
(HYMENOPTERA: EULOPHIDAE) WITH
DESCRIPTION OF A NEW SPECIES

JOHN LASALLE

Department of Entomology, University of California, Riverside, California 92521.

Abstract.—The genus *Zagrammosoma* Ashmead is characterized. The genus *Mirzagrammosoma* Girault is synonymized with *Zagrammosoma*, and the type species, and only included species, *M. lineaticeps* Girault, is transferred to *Zagrammosoma*. New Nearctic distributional records are given for *Z. lineaticeps* from Texas and California, and *Z. mirum* from Washington. New host records are given for *Z. lineaticeps* from *Kiefferia lycopersicella* (Gelechiidae) and *Z. mirum* from *Kiefferia lycopersicella* and *Phthorimaea operculella* (Gelechiidae) and *Phyllonorycter elmaella* (Gracillariidae). A new species of *Zagrammosoma*, *Z. hobbesi* LaSalle, is described from California. A key is given to separate the three species of *Zagrammosoma* which have an entirely black metasoma: *Z. mirum* Girault, *lineaticeps* (Girault), and *hobbesi* LaSalle, n. sp.

Key Words: Hymenoptera, Eulophidae, *Mirzagrammosoma*, *Zagrammosoma*

During a study involving *Mirzagrammosoma lineaticeps* Girault, the type species and only included species in the genus *Mirzagrammosoma* Girault, I realized that this genus was a synonym of *Zagrammosoma* Ashmead. At the same time, I came across specimens of a new species of *Zagrammosoma* from Southern California. The purpose of this paper is to formally synonymize *Mirzagrammosoma* with *Zagrammosoma*, characterize *Zagrammosoma*, describe this new species, and provide new host and distributional records for *Z. lineaticeps* and *Z. mirum* Girault.

Morphological terminology follows that of Graham (1969), except that the term mesosoma is used for the thorax (including propodeum), and metasoma used for the combined petiole and gaster (abdomen minus propodeum).

Abbreviations for collections are as follows: AEI, American Entomological Institute, Gainesville, Florida; BMNH, British

Museum (Natural History), London; CNC, Canadian National Collection, Ottawa; LAS, personal collection of the author; UCR, University of California, Riverside; USNM, United States National Museum, Washington, D.C.

Genus *Zagrammosoma* Ashmead

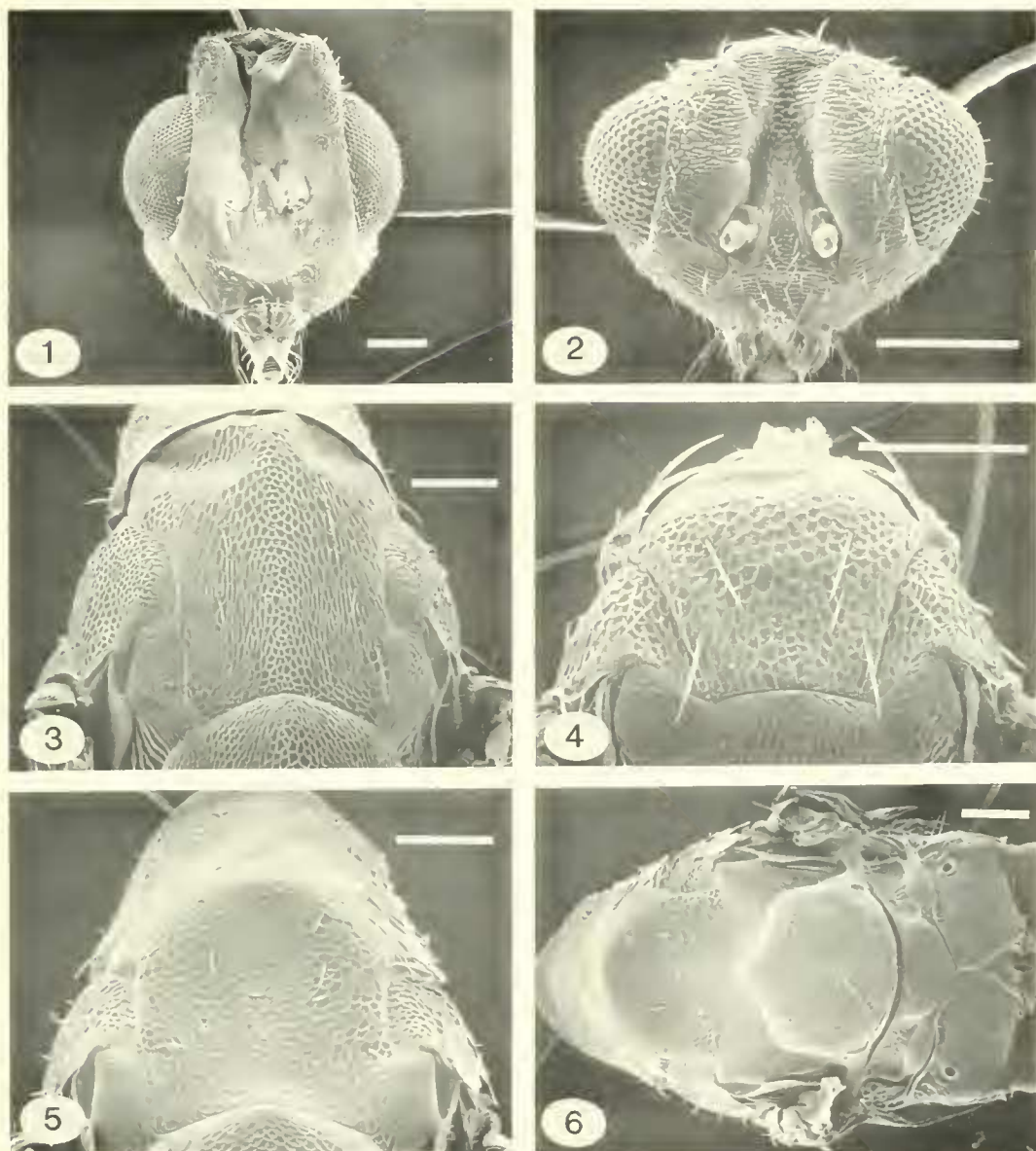
Hippocephalus Ashmead, 1888: viii. Type species *Hippocephalus multilineatus* Ashmead (monotypy). Preoccupied by *Hippocephalus* Swainson 1839, in fishes.

Zagrammosoma Ashmead 1904: 354, 393. Replacement name for *Hippocephalus* Ashmead.

Zagrammatosoma Schulz 1906: 142. Unjustified emendation.

Atoposoma Masi 1907: 276. Type species *Atoposoma variegatum* (monotypy).

Mirzagrammosoma Girault 1915: 279. Type species *Mirzagrammosoma lineaticeps* Girault (monotypy). **N. syn.**



Figs. 1-6. 1. *Zagrammosoma mirum*, ♀, head. 2. *Cirrospilus flavoviridis*, ♀, head. 3. *Z. mirum*, ♀, mesoscutum. 4. *C. flavoviridis*, ♀, mesoscutum. 5. *Z. hobbesi*, ♀, mesoscutum. 6. *Z. hobbesi*, ♀, dorsum of mesosoma. Scale bars = 0.1 mm.

Diagnosis.—Scutellum with 4 setae (2 pairs); submarginal vein with at least 3 dorsal setae; funicle 2-segmented; notauli complete, curving to meet axilla at a distance well separated from posterior margin of mesoscutum; head with vertex vaulted between compound eyes.

Discussion.—Members of the genus *Zagrammosoma* are parasitic on leafmining Lepidoptera and Diptera. This genus is in the subfamily Eulophinae, tribe Elachertini. The subfamily Eulophinae is characterized by: 4 setae on the scutellum; submarginal vein not broken before it reaches marginal

vein, and having 3 or more setae on its dorsal surface; postmarginal vein present and well developed. Elachertini have complete notauli, Eulophini have the notauli incomplete or absent. *Zagrammosoma* is very close to *Cirrospilus*, as both have a 2-segmented funicle, and the postmarginal vein shorter than or equal in length to the stigmal vein. *Zagrammosoma* has been treated as a subgenus of *Cirrospilus* by European authors (Peck et al. 1964, Bouček and Askew 1968), but as a distinct genus by American authors (Peck 1963, Burks 1979). Gordh (1978) also treated *Zagrammosoma* as a distinct genus, and provided a key to Nearctic species. He gave two morphological characters to support *Zagrammosoma* as distinct from *Cirrospilus*: *Zagrammosoma* species have an elongate head which is distinctly vaulted dorsally so that the vertex extends much higher than the compound eyes (Fig. 1); and *Cirrospilus* species have a well developed median carina on the propodeum, while in *Zagrammosoma* this carina is weakly developed or absent. The vaulted vertex is a solid diagnostic characteristic, as it represents a derived character which is unique to *Zagrammosoma* (within the Eulophinae) and this character does not appear in *Cirrospilus* (Fig. 2). However the propodeal carina does not appear to be a good character for the separation of these two genera as it is not constant throughout all the species.

An additional character which may be used to distinguish these two genera is that in *Zagrammosoma* the notaulus curves to meet the axilla, and never reaches, or approaches, the posterior margin of the mesoscutum (Figs. 3, 5); in *Cirrospilus* the notaulus is straight, and extends to the posterior margin of the mesoscutum (Fig. 4).

The genus *Mirzagrammosoma* Girault is herewith synonymized with *Zagrammosoma*. The type species, and only included species, *M. lineaticeps* Girault displays characters consistent with the definition of *Zagrammosoma*: the elongate head with a

vaulted vertex; and the notaulus curving to meet the axilla.

There are presently eight species of *Zagrammosoma* known in North America (Gordh 1978); the inclusion of *Z. lineaticeps* and *Z. hobbesi*, n. sp. brings the number up to ten. Gordh treated only one species of *Zagrammosoma* with an entirely black or dark metasoma: *Z. mirum* Girault (Fig. 7). *Z. lineaticeps* also has an entirely black or very dark metasoma, as well as the new species described in this paper, *Z. hobbesi* LaSalle. These three species are the only Nearctic *Zagrammosoma* without any yellow markings on the metasoma, and the following key will serve to separate females of these species.

1. Forewing (Fig. 8) with a longitudinal dark stripe which extends from near the base of the wing to the anterior margin just before the apex, and connects to transverse stripes which extend to the anterior margin of the wing at the junction of marginal and submarginal vein, and at the base of the stigmal vein; apical margin of wing with a transverse stripe in posterior half *Z. lineaticeps* (Girault)
- 1'. Forewing (Figs. 9, 10) without such a long linear stripe, at most with a U-shaped pattern connecting the junction of the submarginal and marginal veins with the base of the stigmal vein; apical margin of wing without any markings 2
2. Mesosoma dorsally with broad, median yellow stripe (Fig. 7); venter of mesosoma yellow. Funicular segments both the same color, dark dorsally, brown to yellow ventrally *Z. mirum* Girault
- 2'. Mesosoma entirely black, or with only slight yellow markings, not with markings as above. First funicular segment dark, second funicular segment yellow (Fig. 11) *Z. hobbesi* LaSalle, n. sp.

***Zagrammosoma lineaticeps* (Girault),
NEW COMBINATION**

Fig. 8

Mirzagrammosoma lineaticeps Girault 1915: 279. Holotype ♀, MEXICO, San Rafael, Jicoltepec (USNM) [Examined].

Diagnosis.—*Z. lineaticeps* can be distinguished from the other species of *Zagram-*

mosoma with a uniformly black or dark or metasoma by the following characters. Forewing (Fig. 8) with a wide longitudinal dark stripe from the base of the wing which curves to meet the anterior margin of the wing before the apex and which connects to two small transverse stripes which join the anterior margin of the wing at the junction of marginal and submarginal vein, and the junction of marginal and stigmal vein; additionally there is a transverse dark stripe bordering the apex of the wing in the posterior half. Mesosoma entirely black or dark except longitudinal yellow stripe dorsolaterally on pronotum, small longitudinal yellow stripe may be present laterally on mesoscutum; pronotum ventrally yellow. Fore coxa yellow, middle and hind coxae black; fore and middle legs yellow, hind femur and tibia predominantly black, tarsi yellow.

Z. lineaticeps is known in the Neotropical region from Mexico, Central America and the Caribbean (De Santis 1979), however it has only been recorded in the Nearctic region from Florida (Burks 1979). Known hosts were in the Agromyzidae and Lyone-tiidae. The following represent new distributional records from California and Texas, and a new host record from the tomato pin worm, *Kiefferia lycopersicella* (Walsingham) (Gelechiidae).

CALIFORNIA: San Diego Co., Batequitas Lagoon, 1 mi. E. Leucadia, 8.viii.1979, C. W. Melton (8 ♀, UCR).

TEXAS: Cameron Co., Brownsville, 27.vi.1979, E. R. Oatman, ex. *Kiefferia lycopersicella* (6 ♀, UCR).

Zagrammosoma mirum Girault

Figs. 1, 3, 7, 9

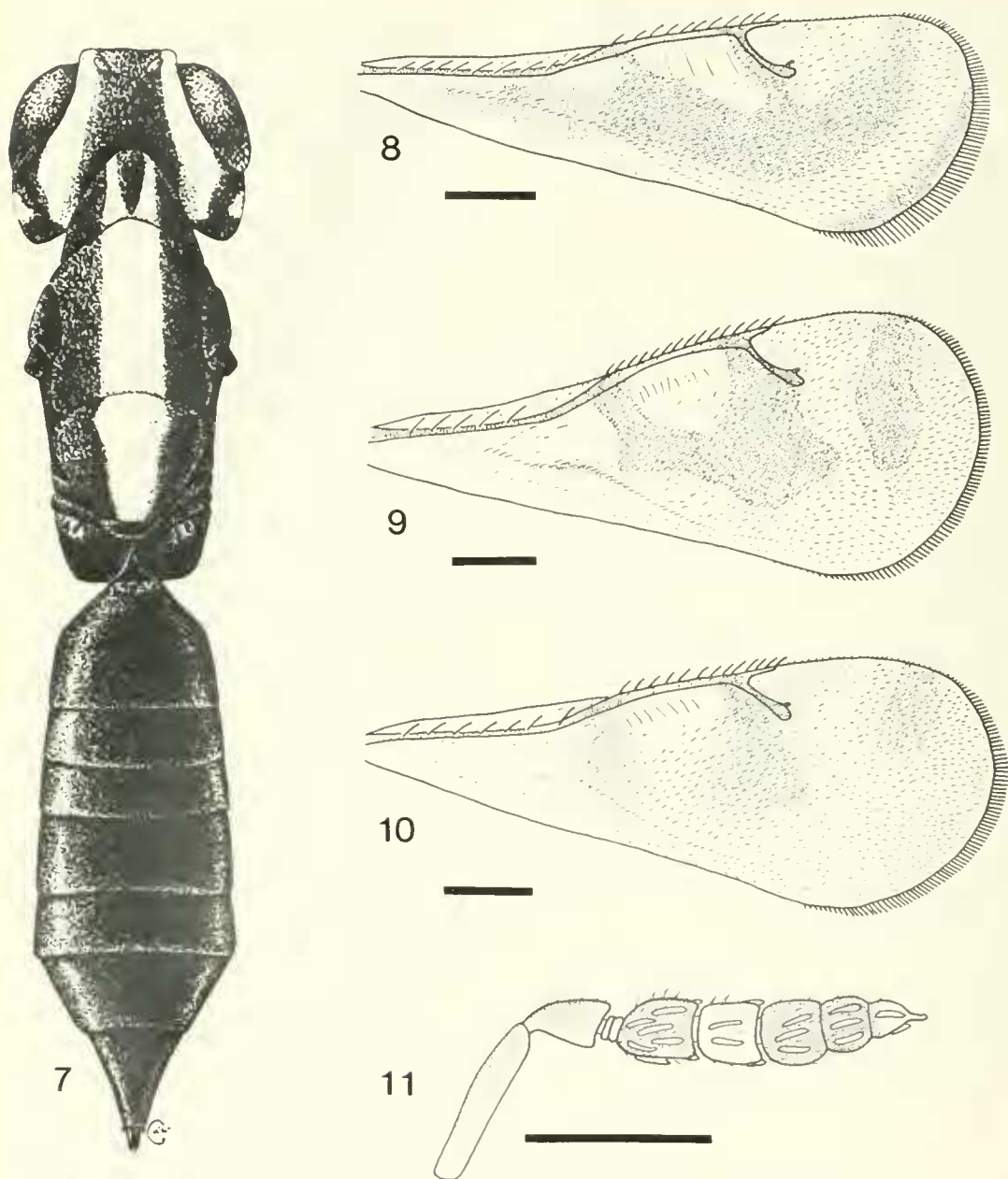
Zagrammosoma mira Girault 1916: 119. Holotype ♀, USA, California, mountains near Claremont (USNM) [Examined].

Diagnosis.—*Z. mirum* can be distinguished from the other species of *Zagram-*

mosoma with a uniformly black or dark or metasoma by the following characters. Forewing (Fig. 9) without a longitudinal dark stripe or transverse stripe along apical margin; with a transverse stripe at level of base of stigmal vein, these stripes connected posteriorly to form a U-shaped pattern; an additional transverse stripe is present in anterior half of wing between postmarginal vein and wing apex. Dorsum of mesosoma (Fig. 7) black or dark, with a broad longitudinal yellow stripe medially on mesoscutum and scutellum, this stripe becoming two parallel stripes on pronotum; additional thin longitudinal stripe laterally on pronotum. Entire venter of mesosoma yellow. All coxae yellow except hind coxa black basally on dorsum; fore and middle legs yellow, hind femur black except extreme base and apex, remainder of hind leg yellow.

As noted by Gordh (1978), the species of *Z. flavolineatum* Crawford (1913) is very similar to *Z. mirum*, differing only in coloration; *flavolineatum* is slightly lighter colored than *mirum*. In *flavolineatum* the metasoma is uniformly dark brown, but there are small but distinct yellow spots laterally on the metasomal tergites; the propodeum has the callus yellow, as opposed to the propodeum completely black or dark in *mirum*; the hind femur has the entire basal half yellow, as opposed to only the extreme base (only about $0.1 \times$ the length of the femur) in *mirum*. *Z. flavolineatum* is known from a single female specimen from Colorado, and this specimen may represent nothing more than a color variant of *mirum*. As Gordh points out, additional material will be necessary to resolve this problem. If they do prove to be synonymous, the name *flavolineatum* would have precedence over *mirum*. Using the key in this paper, specimens of *flavolineatum* would be determined as *Z. mirum*.

Zagrammosoma mirum has previously been recorded only from California. Known hosts are in the genera *Lithocolletis* (Gracillariidae) and *Liriomyza* (Agromyzidae).



Figs. 7-11. 7. *Zagrammosoma mirum*, ♀, body (from Gordh, 1978; length 2 mm). 8. *Z. lineaticeps*, ♀, forewing. 9. *Z. mirum*, ♀, forewing. 10. *Z. hobbesi*, ♀, forewing. 11. *Z. hobbesi*, ♀, antenna. Scale bars = 0.2 mm.

Dr. Michael Schauff has kindly informed me that there are specimens of *Z. mirum* in the USNM collection from Wenatchee, Washington, reared from *Phyllonorycter el-*

maella (Gracillaridae). Additional new host records for this species are:

CALIFORNIA: Riverside Co., Corona, 31.x.1931, A. J. Baringer, ex. *Kiefferia ly-*

copersicalla (Gelechiidae) (1 ♀, UCR); Los Angeles Co., Pasadena, viii.1915, J. E. Gray, ex. *Phthorimaea operculella* (Gelechiidae) (1 ♀, UCR).

***Zagrammosoma hobbesi* LaSalle,**

NEW SPECIES

Figs. 5, 6, 10, 11

Diagnosis.—*Z. hobbesi* can be distinguished from the other species of *Zagrammosoma* with a uniformly black or dark metasoma by the following characters. Forewing (Fig. 10) without a longitudinal dark stripe or transverse stripe along apical margin; with a transverse stripe at level of junction of marginal and submarginal veins, and a transverse stripe at level of base of stigmal vein, these stripes usually not connected posteriorly, but may be faintly connected to form a U-shaped pattern; an additional transverse stripe is present in anterior half of wing between postmarginal vein and wing apex. Entire mesosoma black or dark, except edges of some of the sclerites may be brown or yellow. All coxae black; fore and middle legs yellow; hind femur black except for extreme apex, hind tibia dusky to black basally, yellow apically.

Female.—Length 1.5–2.9 mm. Mesosoma and metasoma entirely black except a small yellow mark laterally on axilla, and anteriorly on tegula. Fore and middle femora and tibiae yellow, hind femur black except yellow apically, hind tibia yellow except usually black basally. Tarsi yellow, distal segments may be brown. Head black and yellow; occiput black with median yellow stripe which extends to vertex and small yellow spot bordering eye; face and frons yellow, with numerous black stripes. Antenna (Fig. 11) with scape yellow, dark dorsapically; pedicel yellow ventrally, dark dorsally; first funicular segment dark, second funicular segment yellow; basal two club segments dark, third club segment dark basally, yellow apically.

Head 1.0–1.2 times higher than wide, the vertex extending distinctly higher than the height of the eyes. Face and frons reticulate. Toruli situated at level of lower eye margin. Eyes 1.2–1.4 times longer than malar sulcus.

Antenna (Fig. 11) with scape 4.3–5.2 times longer than wide. Pedicel 1.3–1.5 times longer than wide. First funicular segment 1.25–1.5 times longer than second. Club about equal in length to both funicular segments taken together. Club and funicle about equal in width.

Mesosoma (Figs. 5, 6) with pronotum, mesoscutum and scutellum distinctly reticulate, metanotum and propodeum lightly sculptured to smooth. Propodeum with median carina; propodeal callus with 4–7 setae.

Forewing (Fig. 10) with a transverse stripe at level of junction of marginal and submarginal veins, and a transverse stripe at level of base of stigmal vein, these stripes usually not connected posteriorly, but may be faintly connected to form a U-shaped pattern; an additional transverse stripe is present in anterior half of wing between postmarginal vein and wing apex. Veins dark except marginal vein yellow. Submarginal vein with 5–8 setae. Submarginal vein 1.45–1.65 times longer than marginal vein; marginal vein 3.0–3.6 times longer than postmarginal vein, 2.15–2.6 times longer than stigmal vein; stigmal vein 1.2–1.7 times longer than postmarginal vein.

Metasoma 3.0–4.0 times longer than wide, pointed apically.

Male.—Length 1.1–1.5 mm. Differs from female only in genitalia.

Distribution.—Known only from Southern California.

Material examined.—Holotype ♀, CALIFORNIA, San Bernardino Co., Summit Valley, 14.v.1985, G. Gordh, on *Eriodictyon* (mounted on point, USNM).

18 ♀, 10 ♂ Paratypes. CALIFORNIA: as holotype (7 ♀, 2 ♂, UCR; 3 ♀, USNM); as holotype but on *Haplopappus* (2 ♀, 1 ♂, UCR); San Bernardino Co., Mojave River

Forks, ~9 mi. S. Hesperia, 2.v.1985, J. D. Pinto (3 ♀, 4 ♂, LAS; 1 ♀, 1 ♂: BMNH, CNC, AEI).

Etymology.—The coloration of the face, yellow with numerous black stripes, is reminiscent of the face of a tiger. This species is named for Calvin's tiger friend, Hobbes.

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